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Civil War Edition, Pars Una

Welcome to the 53rd AMEDD Historian Newsletter – Spring 2026! For the next two editions we are focusing on medicine during the American Civil War. This edition covers topics ranging from a general overview of Civil War medicine to various personalities that enabled the systems to emerge during the conflict. It has been 165 years since the start of the War of the Rebellion, as it is referenced in the War Department's compilation of the official records. With the passing of time, those historically-minded viewers will still see it is possible to progress from our experience – *Experientia et Progressus!*



Civil War Battlefield Medicine: An Acute Overview (Published in *Combat Readiness Through Medicine at the Battle of Antietam*) Scott C. Woodard

The professional Army of the United States, first formed in 1775, was selectively small and reflected the founding generation's fear of a large, standing Army. Even though war had called upon the medical services to repair the wounded and assuage the fevered brows of soldiers in the War of Independence, the War of 1812, and the Mexican–American War, the cadre of medical personnel serving in the U.S. Army was minimal. The thousands of wounded men and animals left dying on the battlefield near Manassas, Virginia, during the First Battle of Bull Run in 1861 gave testimony to the unpreparedness facing both armies. Both armies and their medical departments were not ready. Using lessons learned about sanitation in the Crimean War, civilian relief agencies, such as the U.S. Christian Commission and the U.S. Sanitary Commission, began to fill in the deadly gaps exposed on the bloody fields of combat.

The mid-19th century marked a shift in medicine. The long-respected Greek medical teachings of “balancing the humors” (a theory that stated good health came from the proper balance of bodily fluids) to maintain health, and the slowly emerging scientific method that would eventually prove that germs were not just a theory and anesthesia benefitted the patient, all began to converge during this tumultuous time. Medical officers of the Regular Army were subjected to vigorous boards of review and reflected the best of medical knowledge of their time. But as the flash of battle struck down the men in wool, the complications of logistics and administration structured for peacetime became unbearable and broke under the weight of exponential growth and rapid mobilization of citizens to soldiers.

After his appointment as the Medical Director of the Army of the Potomac under Union General George B. McClellan in July 1862, Major (Dr) Jonathan Letterman began working with McClellan and Brigadier General (Dr) William Hammond, the Surgeon General of the

Army, to implement a new method of battlefield evacuation and treatment. This was the turning point in medical readiness and, therefore, combat readiness in the U.S. Army. Dr Letterman devised an ambulance corps of soldiers solely directed by the medical department and tied into a predesignated hospitalization plan. Before this command-directed order, the corps and regimental ambulances were controlled by the Quartermaster Department and were often operated by ill-disciplined civilian contractors. Through Dr Letterman's specified tasks of weekly inspections and drills, the days of broken ambulances and untrained soldiers were over. Before Dr Letterman's reforms, insular decisions were made for field hospital locations. Some surgeons refused to treat members of other regiments and had little idea of the location of other hospitals. This created a disconnected system where patient flow and surgical intervention should meet. The health of the Army and, therefore, its fighting strength were in jeopardy if change was not forthcoming.

The vast clinical experience gathered by Federal surgeons filled *The Medical and Surgical History of the War of the Rebellion*, the official medical history of the U.S. Civil War. The surgeons' experience with anesthetics, effective antimalarial medications, trauma surgery, open-air recovery, and sanitation marked a path toward better medicine in the Army, nation, and the world. Today's effective practice of clearing the battlefield follows the principles laid out in Dr Letterman's plan. The task of the horse-drawn wagon ambulance is now performed by the horsepowered rotary aircraft.

— 27 July 1775 —

Wounds of War

(Published in *Combat Readiness Through Medicine at the Battle of Antietam*)

Wayne R. Austerman, PhD

The typical American Civil War soldier faced a 25% probability that he would not survive the conflict. The odds were also two out of three that the cause of death would be disease and not combat. Dysentery and diarrhea killed far more men than bullets.

Small arms fire caused 94% of all wounds, with artillery accounting for the rest. More than 70% of all wounds were to the arms or legs. Penetrating wounds to the skull killed 80% of those so wounded, while wounds to the abdomen and chest claimed approximately 74% for each. Spinal wounds killed 56% of the soldiers. In all, the Union forces suffered approximately 110,000 battle deaths, while the Confederates lost about 94,000. Diseases claimed approximately 416,000 Northern and Southern soldiers during the 4 years of war.

Field dressings were not issued to soldiers in battle, and they received no first-aid training. Those who survived their initial treatment at a regimental aid station usually faced a 3 to 5 mile ambulance ride to reach a major field hospital.

Inexperience was the most common trait shared among U.S. Civil War physicians. Few were properly trained in military medicine. Out of approximately 11,000 doctors in the Union Army, only about 500 had received any prewar surgical training. Out of about 3,000 Confederate Army doctors, a mere 27 were school-trained surgeons. Most doctors on both sides had never treated a gunshot wound prior to the war's start in 1861.

The most common form of surgery was amputation. Fully 75% of all wartime surgical procedures involved the removal of a mangled or infected limb. The overall mortality rate for amputations was 26%. Amputations of the leg at the hip joint killed the most soldiers (85%), while the loss of a foot at the ankle resulted in the deaths of only 13% of all patients. Shock and blood loss claimed many, but postoperative infections, particularly gangrene, were the greatest threat to survival in the wake of amputations.



"The Civil War Surgeon at Work in the Field," Winslow Homer's heroic image of medical care in the chaos of the battlefield, 12 July 1862. National Library of Medicine.

A Story of Mixed Results: Charles S. Tripler, Medical Director of the Army of the Potomac Sanders Marble, PhD



Colonel (Dr) Charles S. Tripler. Eventually he would be brevetted to Brig. Gen. National Library of Medicine.

Charles S. Tripler had a 36-year Army career, its high point being service as first Medical Director (modern surgeon) of the Army of the Potomac, the largest force the U.S. had yet fielded. Tripler labored mightily in that position but judged his efforts “neither a complete success nor a very decided failure.” Tripler’s successor, Jonathan Letterman, has generally enjoyed an excellent reputation. Tripler, in contrast, has attracted little attention except sometimes as a counterpoint to Letterman. What did Tripler do, and what results did he achieve?

Tripler was born in New York City in 1806 and grew up fairly poor. His merchant father went bankrupt, and Charles was apprenticed to an apothecary who was also an MD. In his late teens Tripler attended the College of Physicians and Surgeons, graduating in 1827 with a thesis on delirium tremens, and afterwards worked for a year at Bellevue Hospital, already a large facility seeing a wide variety of patients. Showing an early interest in the Army, he volunteered with the surgeon stationed at West Point, taking classes there although not a cadet. He applied to be an Army surgeon, passed the examination, and was commissioned on 30 October 1830. His first duty stations were on the frontiers, first in Maine and then Louisiana, where he probably had responsibility for no more than 100 troops at a time. From 1835-38 he served in Florida at small forts (and apparently on patrols) during the Second Seminole War. Briefly stationed at Buffalo, NY, he was soon reassigned to the De-

troit area, where he met, wooed, and married Eunice Hunt. (The marriage was affectionate; she bore nine children and wrote a devoted biography.) His service there was unremarkable, although he engaged the local scientific and medical community; he would ultimately publish about a dozen articles on various medical and surgical topics.

His first senior position was during the Mexican-American War. He served with Gen. Winfield Scott’s expedition (1847-48) that landed at Vera Cruz, fought several battles, and captured Mexico City. Tripler was appointed Medical Director of Brig. Gen. David Twiggs’s division, but that was more of an additional duty or ‘second hat’ since there were apparently no more than a dozen physicians in Twiggs’s force, and Tripler still provided direct patient care, including battlefield surgery. Twiggs’s force was all Regulars, but Tripler seems to have met with some of the doctors of the volunteer part of Scott’s force, and certainly treated some of the volunteers as patients. Once Mexico City was captured Tripler was placed in charge of the Army’s General Hospital in Mexico City. That was no grand or advanced facility; it was an administrative convenience since a general hospital could take patients from any unit of the Army rather than a regimental hospital which stayed under the control of the regimental surgeon and under the oversight of the regimental commander. Tripler’s ‘general hospital’ had no more supplies, better diagnostic equipment, nor specialized staff, and was scattered among six dark, damp, cold, cheerless buildings. The staff, specifically, were simply detailed from units already in Mexico City, although some local civilians were hired as laborers. Tripler’s experience with a large expeditionary force operating away from its base was of direct patient care; trauma; sickness; limited evacuation (since the American force did not maintain secure communications back to Vera Cruz on the coast); no ambulances (supply wagons were used when needed); and lack of medical staff officers.

After that war, he returned to Detroit, where his civilian contacts presumably led to him being chosen to represent Michigan at the first American Medical Association meeting. Since Michigan was paying for his travel, the Army saw a cheap opportunity and designated him their representative. He was sent to California in 1852, as Medical Director of the Department of the Pacific, but he still treated patients. After four years there, he moved to Newport Barracks, Kentucky, across the river from Cincinnati. The post was the main recruiting base for the western U.S., and Tripler saw many recruits. He had commented that the volunteers in Mexico had suffered higher rates of disease and presumably

was as strict as possible now. He put his observations on paper as *Manual of the medical officer of the army of the United States. Part 1. Recruiting and the inspection of recruits*. Tripler also lectured at a local medical school, and his lecture notes were assembled into another book, *Hand-book for the military surgeon: being a compendium of the duties of the medical officer in the field, the sanitary management of the camp, the preparation of food, etc.* This was aimed at medical students, and seems based on frustration with the volunteer doctors he had encountered in Mexico. The text was quite dry, and there is little discussion of the military surgeon in context of a larger medical system, although one of Tripler's lectures (and not just his notes) was published where he made the basic point: "And *here* is the great and important duty of the medical corps: to *keep* the personnel of the army in effective working order – to preserve the health of the troops – to guard *against* sickness, not simply to treat it when it has occurred." (original emphasis) Tripler talked over prevention; treating both sick and wounded; managing supplies, equipment, and men; and administration. He also sought professional autonomy for medical officers: the Army should trust its physicians to oversee medical matters as they trusted quartermaster officers to handle supplies and ordnance officers to design weapons. He cited the recent events in the Crimea as evidence and spent most of his lecture belaboring that point. Perhaps drawing on his experience in medical lecturing, he was also used as a medical examiner, quizzing those who sought commissions in the Medical Corps.

By the eve of the Civil War, Charles Tripler was a senior medical officer. He had extensive administrative experience, wide clinical experience, and campaign experience. He had mentored young doctors (likely more by letter than in person, so scattered were Army physicians), and was known to many senior officers in the small Regular Army, including Winfield Scott.

In April 1861, shortly after Confederate troops fired on Fort Sumter, Tripler was ordered from Newport Barracks to become Medical Director of the Department of Pennsylvania. That was a new administrative area, comprising Maryland, Delaware, and eastern Pennsylvania, and included some troops in it. The commander, Maj. Gen. Robert Patterson, at 69 was not energetic and was soon relieved for failing to pin Confederate troops that managed to move to Manassas, VA and help win the war's first major battle on 21 July 1861. During and after that battle, Dr William S. King had shown little grasp of

Tripler has been excoriated on two specific topics, not implementing an ambulance corps and preferring regimental hospitals to general hospitals.

Ambulance Corps

Tripler had not written much about battlefield evacuation in his manual, but he recognized the authorized quantities of ambulances (two light and one heavy ambulance per regiment) were insufficient for significant combat. In the autumn of 1861, Tripler considered a centralized ambulance corps for the Army of the Potomac (AoP), but it would be hard to staff (almost all troops had joined as part of a regiment, and it was hard to transfer them) and it would take several miles of space on a road. With Finley averse to the 'Finley ambulance' being dropped, Tripler considered *cacolets*, horse- or mule-mounted litters that could have better cross-country mobility, but the litters proved excessively heavy. Tripler accepted the limitations of existing laws that authorized ten enlisted men per regiment (and the regimental band) trained to provide first aid, load ambulances, and guide the walking wounded to whatever temporary field hospitals were assembled. The regimental ambulances would apparently be augmented with a few ambulances decentralized when the AoP left the Washington area on campaign. He wanted a separate ambulance corps, trained and under medical control, with elements attached to each division and corps of the AoP, but could not attain that, and worked within the existing limits. Suggestions continued arriving, and by the spring of 1862 he added the point that however desirable an independent ambulance corps might be, there was not time to implement it.

Regimental Hospitals vs. General Hospitals

At the time, it was an administrative difference between the two: general hospitals did not have more diagnostic equipment, more supplies, more or necessarily better staff. Their facilities were not necessarily better. In 1861, a general hospital might be bedsacks on the floor of a converted office building with strangers providing what nursing care there was. A regimental hospital could be bedsacks in a tent, but the care was from members of your Army family – your regiment. The difference was the regimental hospital was with the regiment, and under its control, while a general hospital could be hundreds of miles away and required paperwork to transfer the patient out and return the soldier to his unit. Tripler recognized the value of a familiar face to a patient's morale, and the role of morale in recovering. For minor problems, he wanted to start with regimental hospitals. He did not see them as a panacea; general hospitals were part of his first orders to the AoP's doctors. General hospitals were needed: a regiment might have too many troops sick at once, units might need to move, or a patient might need a lengthy recovery. Tripler also accepted brigade hospitals, which did not appear in regulations, as an intermediate step. Tripler's goal was to quickly return troops to duty; for that, travel to and from a remote hospital cut into fighting strength, and so did the administrative processing time.

his duties as Medical Director for Maj. Gen. Irwin McDowell and the Army of Northeastern Virginia. After the U.S. defeat, the poor medical support was another stick with which opponents beat the Lincoln Administration. Patterson, McDowell, King, and others were soon relieved. Maj. Gen. George B. McClellan was brought in to command the Division of the Potomac (renamed Army of the Potomac (AoP) on 20 August), and Charles Tripler would be the Medical Director.

Tripler may have had a clerk at the beginning, but he had no staff. (He would receive two staff officers, titled medical inspectors, in November, and a third in December.) The Army was simultaneously assembling as new volunteer units arrived and disbanding as 90-day volunteer units departed. Tripler's first priority was sorting out the doctors: supplies, facilities, clinical guidance would all have little utility if the doctors were inadequate. Tripler established examining boards, and had inadequate doctors (even by the standards of the time) dismissed. For this, he had nearly carte blanche: McClellan supported Tripler, and there are no indications of significant trouble with other staff officers in the Army of the Potomac. There were outside problems, however. Some regiments had been accepted as-is, and their surgeons could not be dismissed. Clement Finley, The Surgeon General, was an ossified stickler for procedure and protocol, and tried to read each piece of paper that came to his office, and rejected everything that he felt impinged upon his

prerogatives. A civilian organization, the U.S. Sanitary Commission, had been chartered by the Congress in June to work alongside the Army Medical Department. Unsurprisingly, when it saw the confusion, and Surgeon General Finley's inaction, their opinions swung against Regular Army doctors in general.

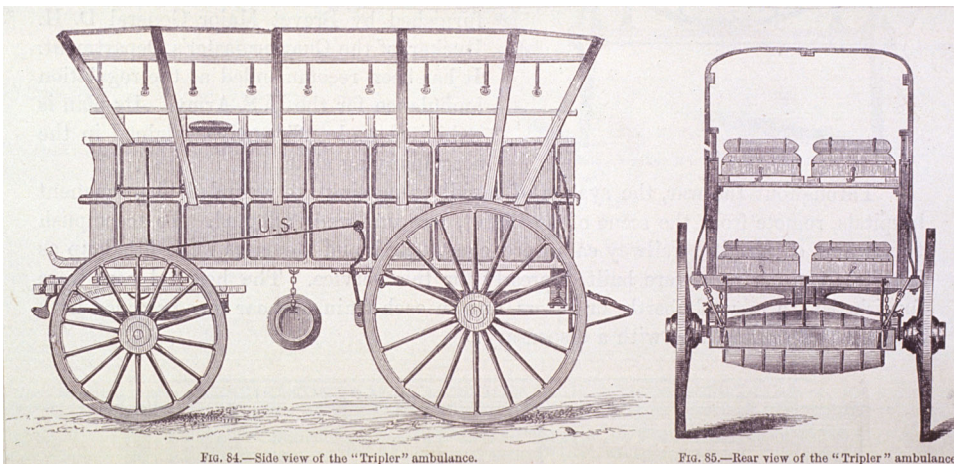


FIG. 84.—Side view of the "Tripler" ambulance.

FIG. 85.—Rear view of the "Tripler" ambulance.

Side and rear views of the "Tripler" ambulance. National Library of Medicine.

By 1861, Tripler had spent more than half his life in uniform, and while he saw times to work around regulations, he clearly saw regulations as necessary in a hierarchical organization and changing the regulations as a way to make systemic changes. Meanwhile, civilians like the Sanitary

Commission saw many rules as red-tape and railed against them. Tripler had seen problems with volunteers (troops and doctors) in Mexico. He saw many of the same problems again in 1861 (for instance, he railed against the lax enlistment physical examinations that allowed many incapable men into uniform, who had to go through the lengthy process to be discharged and cost the government money every day) and clearly thought the way to correct problems was to understand the rules and hew more closely to them. The Sanitary Commission, in contrast, saw the answer in changing (and loosening) the rules. There was not likely to be much agreement.

Meanwhile, Tripler was trying to sort out problems under his direct control. After clearing out the bad doctors he could, he took charge of assigning doctors within the AoP. That included Brigade Surgeons, a new position, and Tripler deliberately chose officers as brigade surgeons who could tutor the regimental surgeons below them. Unlike his experience so far, he was using indirect leadership. He still had newly assigned doctors report to him, doubtless interviewing them and giving them an orientation to their responsibilities.

Once he had decent doctors, he focused on making sure they had supplies. The Army did not suffer from significant shortages of medicines, but newly-uniformed doctors had no experience with the military supply system and could struggle to get what was available. In an age of patent medicines, they often wanted 'medicines' that were not on the Army's supply list, and Finley typically rejected these requests when they wended their way to his desk. Tripler not only helped his doctors understand the official supply system, he provided advice on how to work through quartermaster supply channels for some items, and got supplies from the Sanitary Commission when necessary. Other supplies had their own problems. Medical tents were in short supply because canvas was in short supply, and Tripler had to spend time making sure units got what they were supposed to have (and no more) but he also tried to stiffen the spines of doctors whose hospital tents had been appropriated by regimental commanders for other purposes. Similarly, ambulances were in limited supply as all kinds of wheeled vehicles were needed. The light two-wheeled ambulance was popular with officers simply for transportation, and Tripler struggled to get those back under medical control, while production

of the heavier four-wheeled ambulance lagged. (Tripler wanted to stop procurement of the two-wheeler 'Finley' ambulance, but its designer used his position to block that despite the wounded begging to be removed from it as it bounced. The four-wheel 'Tripler' ambulance would prove durable but was gradually replaced during the Civil War with lighter four-wheel models.)

Tripler saw chaotic patient care, and moved to organize it. At the time, civilians largely received medical care in their homes, and there were few large hospitals. In the Regular Army, the regiment was the soldier's 'home' and they received care in a regimental hospital, unless there were so many troops (and patients) in an area that general hospitals were organized. Procedures to move patients from one to another were non-existent, and Tripler saw patients who spent the night in ambulances that were trying to find an open hospital bed. He promptly centralized patient transfers in his office, meanwhile trying to organize enough general hospitals in the Washington area to accommodate the patients. At first, large buildings (mostly public buildings, but also hotels and even large private homes) were used, but it was clear these would not be adequate. Tripler and the Sanitary Commission had meetings about purpose-built hospitals, arguing over features, quantity, and cost. Meanwhile, Tripler went as far as New York City to find existing structures that could be adapted. He also dealt with Finley's opposition, for Finley conceived that any hospital outside the AoP's geographical boundary was under his jurisdiction. Finley even chewed out Tripler with another officer present, leading to Tripler requesting court-martial charges. Finley would apologize, but clearly his support was limited.

Tripler was also overseeing medical care. Troops were pouring into the Washington area, bringing diseases with them, and getting each other sick. Even before the Germ Theory was accepted, there was empirical evidence about crowding, ventilation, and sanitation. Tripler was more successful in some areas (e.g. smallpox vaccination) than others (camp sanitation) and there was no shortage of disease in the camps. Tripler took what measures he could, for instance encouraging units to move onto hills to avoid 'miasmas' and thus malaria (although presumably moving away from the low-lying mosquito-breeding areas was the real benefit), and getting supplies of quinine and whiskey (to make the bitter quinine more tolerable) from the Sanitary Commission when Finley would not authorize it. Overall, diseases stayed about the 7% level (measured as men off duty due to sickness or injury), and Tripler was annoyed by press reports that the Army was being destroyed by disease. [To be continued in #54, Summer 2026]

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Jonathan Letterman: Father of Modern Battlefield Medicine
(Published in *Combat Readiness Through Medicine at the Battle of Antietam*)
Scott C. Woodard

Jonathan Letterman was born in Canonsburg, Pennsylvania, on 11 December 1824, and graduated from Philadelphia's Jefferson College in 1845. Following an apprenticeship with his physician father, he graduated from Jefferson Medical College in 1849. Coincidentally, the medical school was originally established by his future commander's father, Dr George McClellan. Dr Letterman competed for a commission in the U.S. Army Medical Corps along with 51 other applicants in an examination board held in the state of New York. He was one of nine who was offered a commission. It was here that Dr Letterman met Dr Hammond, another successful candidate in that intense review board. Assistant Surgeon Letterman's early assignments included Fort Meade, Florida (1849–1853); Fort Ripley, Minnesota (1853–1854); Fort Leavenworth, Kansas (1854); Fort Defiance, New Mexico Territory (1854); Fort Union, New Mexico (1855–1858); Fort Monroe, Virginia (1858–1859); New York City (1859); and the Department of California (1860–1861).

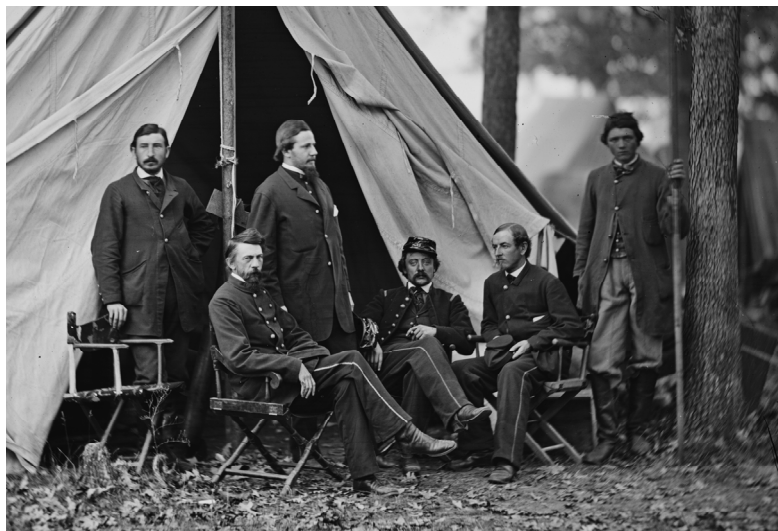
During this time in the U.S. Army, medical officers' ranks were actually descriptive of their positions. For example, doctors serving with the rank of "assistant surgeon," which was equivalent to a lieutenant or captain, could serve in staff positions and inspect hospitals within a command. The rank of "surgeon" was equivalent to a major.

In those grooming positions, Dr Letterman performed the expected duties of a frontier Army surgeon. He conducted inspections to ensure conditions were sanitary, treated the sick and wounded, reported meteorological conditions, and campaigned against Apache and Paiute Indians.

But it was in the early portion of the War of the Rebellion that serendipity played its hand. As the Medical Director of West Virginia, Dr Letterman knew Major General George B. McClellan, Commander of the Department of the Ohio; he also knew Hospital Inspector William A. Hammond. McClellan was eager to reform the Army and was an early champion of the U.S. Sanitary Commission. The U.S. Sanitary Commission was a nongovernmental agency that advocated for Army medical reform and, functionally, filled the gap in Army treatment and evacuation. This same organization, in turn, advocated for the ascendancy of Dr Hammond to the position of Surgeon General. By the time McClellan assumed command of the Army of the Potomac in July 1861, and after subsequent medical disasters on the Virginia Peninsula, the Army was ripe for a change in medical leadership. Unfortunately, the initiatives of then Major (Dr) Charles S. Tripler, previous Medical Director of the Army of the Potomac (Dr Letterman's predecessor), were not implemented by the Army. In addition, the Army's Medical Department was considered by many to be disorganized and poorly run.

Dr Letterman, who was then an Army major, assumed medical directorship on 4 July 1862 of a unified army of 100,000 soldiers under McClellan's Army of the Potomac. The Army's entire movement from the Virginia Peninsula to western Maryland was an exercise in logistics, as ambulances and equipment were added en route. Dr Letterman's appearance swept in a wave of reform. The new director wrote the following:

The subject of the ambulances became, after the health of the troops, a matter of importance. No system had anywhere been devised for their management. They were under the control both of Medical officers and Quartermasters, and, as a natural consequence, little care was exercised over them by either. They could not be depended upon for efficient service in time of action or upon a march, and were too often used as if they had been made for the convenience of commanding officers. The system I devised was based upon the idea that they should not be under the immediate control of Medical officers, whose duties, especially on the day of battle, would prevent any proper supervision; but that other officers,



Major (Dr) Jonathan Letterman, Medical Director of the Army of the Potomac beginning 4 July 1862 (seated in front of the pole), with his staff at Warrenton, Virginia. Behind him (left to right) are two contract surgeons, a medical cadet, assistant surgeon, and orderly. Library of Congress.

appointed for that especial purpose, should have direct charge of the horses, harness, ambulances, etc., and yet under such regulations as would enable Medical officers at all times to procure them with facility when needed for their legitimate purpose.

Dr Letterman's reform movement was based on his keen sense of what was needed to improve medical readiness and on the importance of relationship building. He saw beyond myopic circumstances and tactical scenarios. His vision was far-reaching and bold. The Army's inability to evacuate patients and push them to surgical care was an indicator of operational failures. Dr Letterman saw the bigger problem and understood his purpose in the Army. He knew the readiness of the Army to win in combat was measured by its ability to employ the skills of its primary weapon—the soldier. The sick and dead cannot fight.

Following the war, Dr Letterman expressed these thoughts:

A corps of Medical officers was not established solely for the purpose of attending the wounded and sick; the proper treatment of these sufferers is certainly a matter of very great importance, and is an imperative duty, but the labors of Medical officers cover a more extended field. The leading idea, which should be constantly kept in view, is to strengthen the hands of the Commanding General by keeping his army in the most vigorous health, thus rendering it, in the highest degree, efficient for enduring fatigue and privation, and for fighting.

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<i>Civil War Medical Structure</i>	
Civil War leaders demonstrated foresight when it came to providing medical support for soldiers in the field. Medical personnel were assigned to units from the regiment through the Army level. Medical support above the regimental level was dependent upon the field commander's direction. Although there were some discrepancies, the general provisions for medical units and support were as follows:	
<i>Unit</i>	<i>Medical Support</i>
Regiment, Infantry Approx. 1000 soldiers	2-3 Surgeons (1 Surgeon was detached for hospital service support from the rear) 2 ambulances (3 men each) plus an NCO and 1 wagon with supplies
Regiment, Cavalry Approx. 800 soldiers	2 Surgeons 2 Farriers per soldier 1 Veterinary Sergeant 1 Veterinary Surgeon (after 24 March 1863)
Brigade, Infantry	Surgeon-in-Chief (Brigade Surgeon) 1 wagon with supplies 3 ambulances (3 enlisted men each) & 1 Lieutenant
Division, Infantry	Medical Director (Division Surgeon) 1 field hospital (3 operating teams) Ambulances under a Lieutenant
Corps	Medical Director (Corps Surgeon) 1 Medical Inspector (staff officer) 1 Medical Officer in Charge of Hospitals Ambulances under a Captain
Army eg. Army of the Potomac	Medical Director (Army Surgeon) 1-2 Medical Inspectors (staff officers) 1 Medical Purveyor (supply officer) Ambulances under a Major

Dental Care in the Union Army

(Published in *A History of Dentistry in the U.S. Army to World War II*, Chapter 2 “The Civil War: Dental Care in the Union Army 1861-1865”)

The unprepared army is a constant theme for many origin articles. While American Army shortcomings in terms of size, training, and equipment are well-documented for the Civil War, a less examined but critical deficiency existed within its medical services: there was no provision for dental care. The Union Army entered the war without a single dental surgeon and did not even supply toothbrushes to its troops. This oversight created a painful paradox. The military imposed strict dental standards for enlistment, recognizing the importance of healthy teeth for a soldier's basic functions, yet it offered no means to maintain that health once a soldier was in the field.

A Hurdle to Enlistment

In the mid-19th century, dental health among Americans was generally poor, a problem exacerbated by an increased consumption of refined sugars and fresh meats, which contributed to decay. To serve in the Army, a potential recruit had to pass a physical examination where the surgeon would determine “whether he has a sufficient number of teeth in good condition to masticate his food properly, and to tear his cartridge quickly and with ease.” The standard infantry rifle of the era, the Springfield Model 1861, used paper cartridges containing a lead Minié ball and black powder. To load the rifle, a soldier had to tear open the cartridge with his teeth before pouring the powder down the barrel. Masticating (chewing) army rations, which often consisted of notoriously tough hardtack and salted meat, required strong molars.

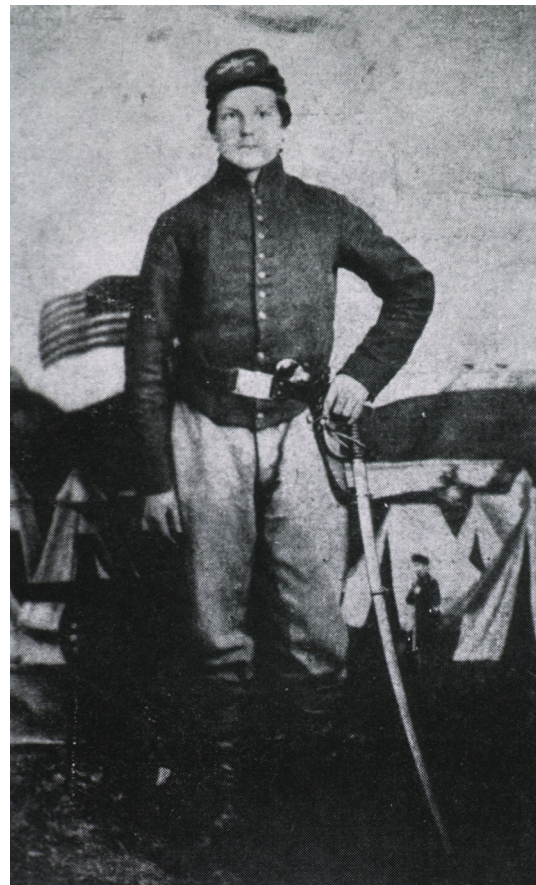
Revised regulations became even more specific, making “total loss of all the front teeth, the eye-teeth, and first molars, even if only of one jaw” a cause for rejection. The consequence of these standards was a high rate of disqualification. Conscription records from 1863 show that nearly one-fifteenth of all physical exemptions were for “loss of teeth.” By 1864, that number had risen to nearly one-tenth. So crucial were teeth for service that some draftees, seeking to avoid the war, had them extracted. Dr David Noble of Ohio reported one man who “exhibited twelve sound teeth that had been recently extracted, thus settling the question that a man may stand the steel, but fear the powder and lead.”

Dental care?

For the soldier who passed his dental examination, any subsequent problem became a personal ordeal with little hope for professional relief. Dental care a soldier received was either paid for out-of-pocket, a near impossibility for a private earning thirteen dollars a month, or was administered by an Army surgeon, a hospital steward, or a fellow soldier. The care provided by surgeons and stewards was rudimentary and often brutal. Dr John Sayre Marshall, a Civil War veteran who would later be called the “Father of the Army Dental Corps,” recalled the grim reality:

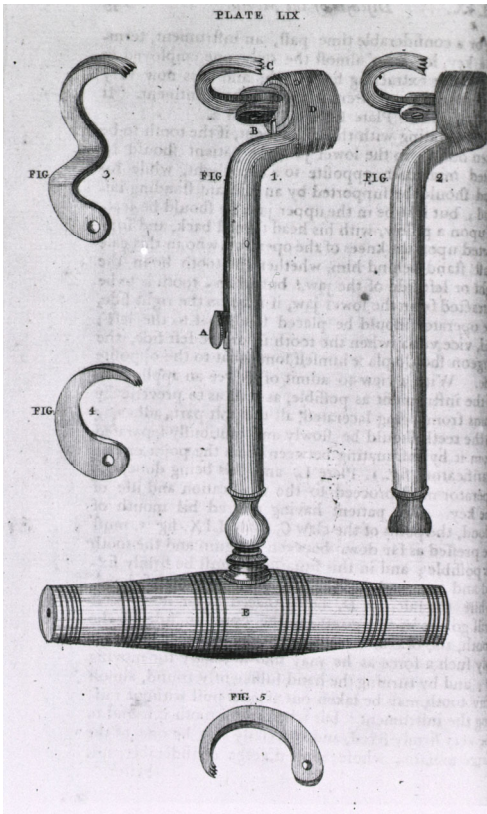
In the Union armies the only dental service rendered was that of lancing a “gum boil” and the extraction of teeth. The latter service was usually performed by a hospital steward, whose only qualification for this service was generally the fact that he possessed a muscular right arm. The victims, God rest their souls, after one experience with the hospital steward were not usually willing to submit to such treatment a second time.

As the profession was still nascent, supplies were limited. The government provided Army surgeons with basic sets of dental instruments: “one turn-key, [tooth key] two pairs of straight forceps, one pair of lower molar forceps...one gum lancet, one stump screw [occasionally].” Most surgeons, untrained in dentistry, were reluctant to perform procedures. As editor Dr William Roberts noted in the *New York Dental Jour-*



John Sayre Marshall, with the 2nd New York Volunteer Cavalry during the Civil War. Later, he would become a physician and dentist, continually lobbying for dental commissions, receiving the first one in 1911. He is often called the “Father of the Army Dental Corps”. National Library of Medicine.

nal, the army surgeon was "generally not only utterly incompetent to the proper care of the teeth, but he is also entirely averse to it, and when forced to its consideration, hastens his disagreeable task as much as possible." The experience of First Lieutenant Ziba Graham after two days of fighting at Gettysburg illustrates the soldier's plight. Suffering from a painful tooth, he went to the regimental surgeon, who "laid me on the ground, straddled me, and with a formidable pair of nippers pulled and yanked me around until either the tooth had to come out, or my head off. I was glad when the head conquered."



A "tooth key" of the same design as those used during the Civil War for extractions.

With few options for tools and treatment, oral maladies were often treated by removing teeth. National Library of Medicine.

Commission efforts

From the outset of the war, civilian dentists began advocating for a professional dental service. In July 1861, Dr William Roberts published a comprehensive plan for a "Dental Department of the United States Army." His proposal mirrored the structure of the Medical Department, calling for a "Dental Surgeon-General" to head the corps, "Dental Inspectors" assigned to oversee several regiments, and ranked "Dental Surgeons" and "Assistant Dental Surgeons" at the regimental level. He argued this would be a "humane" and "economical" measure.

Others, like Dr John Hugh McQuillen, co-editor of *Dental Cosmos*, were more skeptical. McQuillen argued that with the government spending \$1.5 million daily on the war, it was unlikely to approve the "very large additional outlay" of a new department. He also foresaw logistical hurdles in supplying materials like gold foil and the difficulty soldiers would have in paying for anything beyond basic extractions. His observations were astute, highlighting the chasm between the ideal of comprehensive dental care and the harsh realities of a nation at war.

These debates spurred the organized dental profession into action. In August 1861, the American Dental Convention appointed a committee to lobby the government. In 1862, they received a glimmer of hope. Surgeon General William Hammond, a reformer in the Medical Department, responded to a letter from the committee by expressing his support. "Nothing would give me greater satisfaction than to have a corps of accomplished dentists added to the medical department of the army," he wrote. "I shall recommend it in my report to Congress." However, he noted that "Nothing can be done, however, but by law."

The lobbying continued. A year later, in 1864, Dr Samuel White, head of a major dental manufacturing company, secured a personal meeting with President Abraham Lincoln to plead the case. Lincoln advised him to speak with Secretary of War Edwin Stanton. Unable to get an audience with Stanton, White met with the acting surgeon general, Colonel Joseph Barnes, who repeated the now-familiar refrain: nothing could be done while the armies were actively campaigning. The only tangible result of White's effort was an order for his company to supply the Army with more dental forceps. For now, the door to a professional dental corps remained firmly closed.

Dentists in the War

Despite the government's refusal to grant them official status, many dentists served. They enlisted as privates, received commissions as line officers, or, if they also held a medical degree, served as Army surgeons. Dr Charles Koch, an infantry officer, carried "a small satchel, in which he kept dental instruments and medicines to relieve the tortures of the mouth" for the duration of his service. Dr John Randolph Lewis, a dentist and physician, rose to the rank of colonel in the 5th Vermont Infantry. After his arm was shattered by a musket ball in the Wilderness Campaign and amputated at the shoulder, he was appointed to the Veteran Reserve Corps at the personal request of General Ulysses S. Grant, who recognized that the injury prevented Lewis from returning to his dental profession.

When General William T. Sherman's army reached Savannah in December 1864, the troops were in a wretched state. Dr Findley Y. Clark, a local dentist, wrote, "From daylight until dark our dental offices were besieged. The cry was, 'Do something for my teeth that will keep them from aching.'" Even high command understood the importance of oral hygiene. A participant in the Vicksburg campaign noted that General Grant's only personal baggage was his toothbrush. Often overlooked, there was a definite need beyond oral hygiene for dental expertise. Final federal statistics

showed that 4,502 Union soldiers sustained gunshot fracture wounds to the face. Care of these grievous wounds resulted in relatively low mortality rates after surviving the initial phases of injury, but reconstruction advances were not available at that time.

Conclusion

When the Civil War ended in April 1865, American dentists were, in an official sense, exactly where they had been four years earlier. The Army still had no dental corps; however, the war was not a total failure for the cause of military dentistry. The unofficial work of dentists in treating maxillofacial injuries validated their specialized knowledge. Lobbying efforts raised the profile of the profession and laid the foundation for future campaigns. Most importantly, the war created a generation of veterans—from generals to privates—who understood from personal, often painful, experience the critical need for dental care in the military.

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— 27 July 1775 —

Veterinary Progress During the Civil War

Nolan A. (Andy) Watson



If veterinary personnel were unavailable or overlooked, blacksmiths and farriers were responsible for equine health. Detail “Army forge scene, in front of Petersburg [VA]” August 1864. Library of Congress.

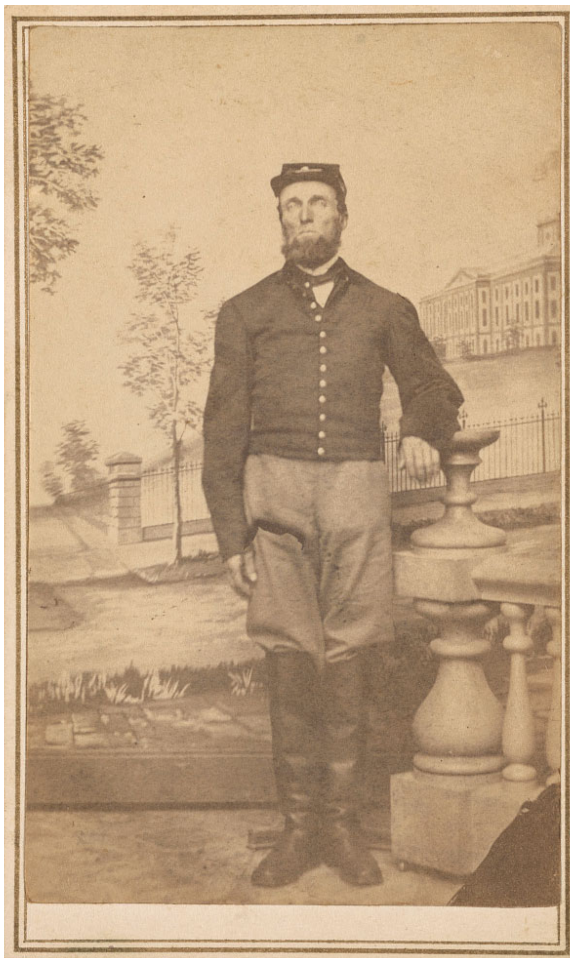
Through massive loss of human and animal life, the American Civil War advanced the cause for formal veterinary education and eventually veterinary commissions in the Army; however, official recognition for the profession would still be years in the future. Equine care was the primary task for veterinary professionals. As mounts in combat, sources of mobility, and the muscle for many tasks, horses and mules were needed in the many thousands to keep the Army moving toward victory.

Before the Civil War, veterinary medicine in the United States lagged behind Europe. Veterinary courses, schools, and later informal “colleges” developed in America in the 1840s-1850s. With small numbers of veterinary practitioners, care for military animals was largely the responsibility of farriers, who were not just tasked with horse shoeing

Civil War veterinary surgeons were considered civilian employees, and their names often do not appear on official military rosters. While records are sparse, here are two known Civil War Veterinarians:

George F. Parry: A graduate of the Boston Veterinary Institute, Parry was one of the first formally educated veterinarians to serve in the Union Army. His detailed diary from his time with the 7th Pennsylvania Cavalry provides a vivid account of the challenges faced. He documented widespread animal starvation, the spread of disease from spoiled forage, and the grim task of dealing with the dead after battles. Parry's writings also show his efforts to enforce humane treatment, as he once pressed charges against two soldiers for abusing their horses. The Historical Society of Pennsylvania link to George Parry's diary: <https://hsp.org/blogs/fondly-pennsylvania/george-f-parrys-civil-war-diaries-introduction-and-january-1863>

Dr Joseph Bushman: A graduate of the Royal Veterinary College in London, Bushman was commissioned in the Quartermaster Corps and briefly was assigned to a horse and mule supply depot on the Potomac.



Records and images of Veterinary Surgeons during the Civil War are scarce. This image of H. (Harry?)

H. Billings, Veterinary surgeon of Company G, 2nd Massachusetts Cavalry Regiment, shows him with the chevrons equivalent to a Regimental Sergeant Major and possibly a Hospital Steward half chevron. Library of Congress.

but also responsible for rudimentary care of the animals. The titles "farrier" and "veterinary surgeon" were used interchangeably in the earliest part of the 1800s.

In 1856, Captain George B. McClellan, after observing European armies, recommended that the U.S. Army establish its own veterinary school to ensure a supply of well-trained professionals. His recommendations were not acted upon. The American Army was not very large and only expanded for wartime. The cost of maintaining the larger force and its horses was deemed too great by Congress.

At the outset of the American Civil War in 1861, the consequences of this neglect became immediately apparent. The Army entered the war with very few veterinarians in its service. It was understood that military equines needed care, and a law in July 1861 framing the 3rd Cavalry Regiment allowed for a Veterinary Sergeant for each of the unit's three battalions. A farrier was to support each of the unit's 12 companies.

As the Army greatly expanded, not all units adopted the new organization and many reverted to equine care from farriers or blacksmiths. Keep in mind the Army is increasing at a massive rate, incorporating state militia and volunteer units that were never federalized before. There are some examples from Cavalry unit structures that allowed for a Veterinary Surgeon. Not commissioned, and serving as a civilian, the veterinary surgeon was equivalent to the Cavalry Regiment's Sergeant Major, being paid \$75 per month. Their duties included supervising farriers and inspection to ensure healthy animals were purchased. War Department General Orders No. 259, dated August 1, 1863, provides details on the selection and appointment of Veterinary Surgeons. We know that Cavalry units sometimes had veterinary support from these records, but most units had horses or mules of some number, but their veterinary support is unknown.

Despite these efforts, horses died at an alarming rate largely from starvation, exhaustion, and disease. A quartermaster report from 1863 lamented the "waste of horses" and their "quick and needless demise" due to a lack of proper knowledge and care. Battle wounds also took a great toll on horses. As an example, at the Battle of Gettysburg the 9th Massachusetts Artillery Battery went into battle with 110 horses; after the battle, the unit only had 22 horses. The loss of animals was a great expense to the war effort, and replacement animals had to be found. The crisis in the

Army also spurred action in the civilian world. In 1863, leading veterinarians met in New York City and chartered the United States Veterinary Medical Association (which later became the American Veterinary Medical Association or AVMA), an organization founded partly in response to the costly animal losses and lack of standardized practices within the military.

While the Civil War was devastating for Army animals (an estimated 1.2 million equines died in the war), it forced the military to recognize the essential role of veterinary medicine. In the years following the war, the Army continued to formalize the position, appointing two veterinarians to each of its new cavalry regiments in 1866 and establishing examination standards for the role by 1877. The path to full professional recognition was not immediate. After the Civil War Army Veterinarians were still considered civilian employees. However, the war had laid the foundation. It demonstrated that the health of its animals was a strategic military necessity and elevated the status of the veterinary profession.

Glanders

For equines, glanders was a particular problem. Glanders is a highly contagious and fatal bacterial disease that affects horses, donkeys, and mules. It manifests in several forms, including a nasal form with thick discharge and ulcers in the nasal passages, a pulmonary form with lung lesions, and a cutaneous form, known as "farcy," which caused skin nodules and ulcers that discharged infectious pus. The disease spreads easily through contaminated food and water, shared equipment, or direct contact between animals and sometimes humans. The movement and massing of forces during the Civil War created conditions for glanders to spread, and the disease went from a regional issue to a problem for much of the United States.

In a time before the acceptance of the germ theory of disease, thousands of animals were crowded into unsanitary stables and corrals, where they shared watering troughs, increasing the risk of transmission. The constant movement, stress of campaigns, and poor nutrition weakened the animals' resistance to infection. Because there was no cure and no vaccine, the only way to control an outbreak was to euthanize infected animals. However, the lack of trained veterinarians often led to misdiagnosis or a failure to act, allowing the disease to spread uncontrollably.

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— 27 July 1775 —

"I was the Chief Surgeon of the European Theater of Operations during World War II, a position similar to that of Letterman in the Army of the Potomac. At that time I often wondered whether, had I been confronted with the primitive system which Letterman fell heir to at the beginning of the Civil War, I could have developed as good an organization as he did. I doubt it. There was not a day during World War II that I did not thank God for Jonathan Letterman."

MG Paul R. Hawley



Dorothea Dix, Army Nursing, and the Legacy for Modern Mental Health Advocacy

LTC Allison Ferro, PhD, RN

The American Civil War marks not only a turning point in American history, but also how the United States undertook care of wounded. The chaos of this conflict forced the nation to confront the need for organized medical systems, trained caregivers, and humane treatment for the vulnerable. Standing at the intersection of these transformations was Dorothea Lynde Dix, a prominent figure whose influence still resonates with Army Nurses today. Her leadership as Superintendent of Army Nurses and her lifelong advocacy of the mentally ill helped shape the professional identity of nursing and laid early groundwork for the modern struggle against mental health stigma.

Dorothea Dix did not enter the Civil War as an unknown figure. By 1861, she had already spent two decades traveling the country, documenting the horrific conditions in prisons and asylums, and lobbying state legislatures to build humane institutions for the mentally ill. She was relentless, strategic, and unafraid to confront anyone, including leaders in a male dominated profession, who dismissed her concerns. When the war began, she brought that same determination into the Union Army, accepting the newly created role of Superintendent of Army Nurses. At this time, the U.S. Army Nurse Corps had not yet been created, and it would not be formally established during Dix's lifetime.

Her appointment in June 1861 came with sweeping responsibilities. She was charged with recruiting, vetting, and assigning female nurses across Union military hospitals, which was a monumental task in a nation unprepared for the scale of suffering the war would bring. She established strict recruitment standards that became controversial, but were in line with the traditional roles of women at the time: nurses had to be over thirty, plain in appearance, and dressed modestly in dark clothing. Dix believed that older, serious women would be less likely to attract unwanted attention from male staff and soldiers, and more likely to maintain discipline in the emotionally charged environment of wartime hospitals. She was determined to protect her nurses from accusations of impropriety, knowing that one misstep could jeopardize the entire program during a time where recruitment was essential. She saw structure and discipline as essential to performing nursing care.

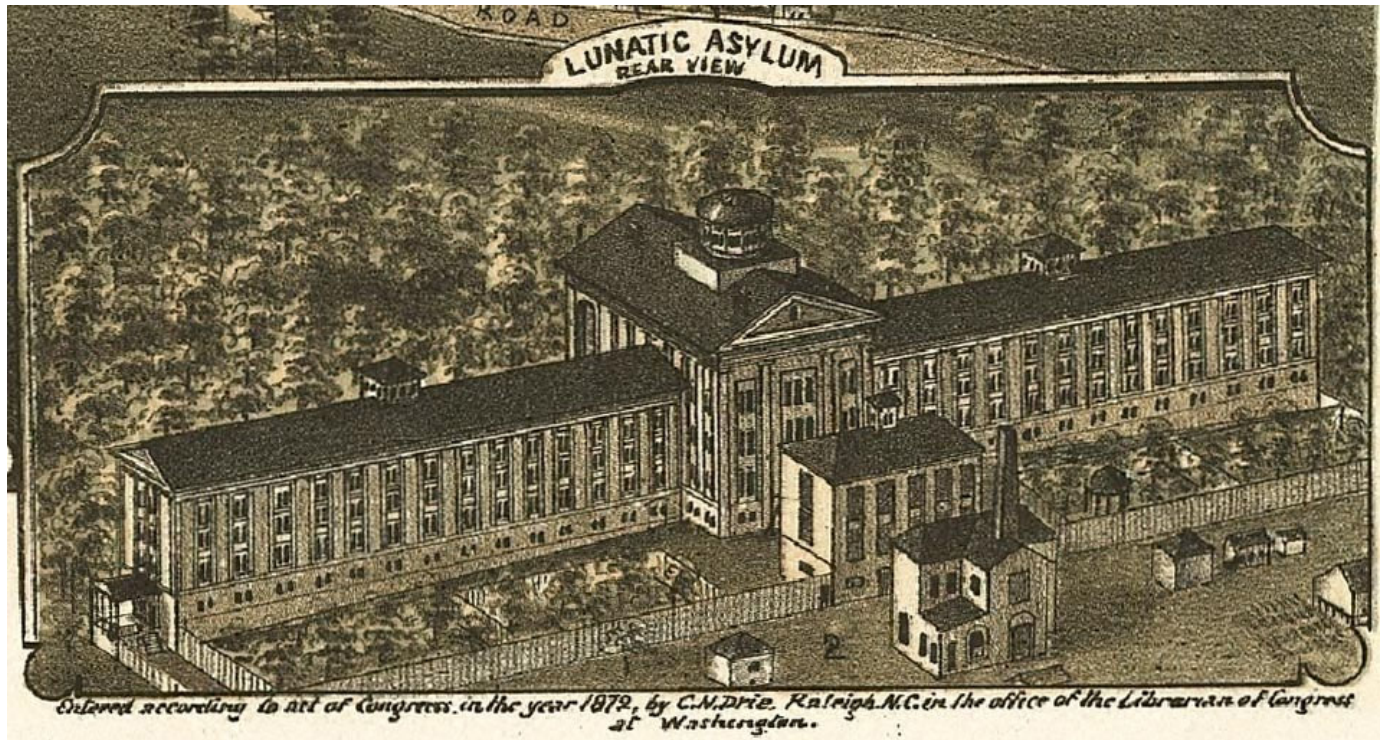
Her standards, however, quickly became a source of friction. Many surgeons resented the idea of female nurses altogether, and Dix's insistence on discipline and propriety only heightened tensions. She also clashed with medical officers who wanted to hire younger women or who resisted her authority to assign staff where they wanted. Some accused her of being inflexible; others complained that her nurses were too independent as women were typically in more subservient roles at the time. But despite the conflicts, Dix succeeded in establishing a system of organized nursing support where none had existed before. She created rosters, assignment protocols, and expectations for conduct that helped professionalize the role of nurses in wartime hospitals.

Prior to the Civil War, nursing in the United States was not recognized as a formal profession. There were no standardized training programs, no credentialing processes, and little public understanding of what nurses did. While women typically served as informal caregivers in families and communities to include females in religious service such as nuns, the role of women in combat was less palatable. The structures Dix envisioned and put in place helped lay the groundwork for the emergence of Army nursing as a respected field in the decades that followed. Her work demonstrated that disciplined, well-organized nursing care could dramatically improve outcomes for wounded soldiers. It also showed that women could serve in critical medical roles with competence and authority, challenging long-held assumptions about gender and professional capability. Her emphasis on discipline and training parallels the rigorous preparation expected of nurses today, whether in military or civilian settings.



Portrait of Dorothea Dix, National Museum of Civil War Medicine .

Dix's influence on Civil War nursing cannot be separated from her earlier work in mental health reform. Long before she stepped into military service, she spent years documenting the neglect and abuse of people with mental illness. She visited jails where individuals with psychiatric conditions were chained in basements, exposed to the elements, or left without food, clothing or bedding. She wrote detailed reports and delivered them to state legislatures, arguing that the mentally ill deserved humane treatment. Her advocacy led to the construction or expansion of more than thirty state hospitals and helped shift public perception toward the idea that mental illness was a medical condition requiring care. Although later vetoed, Dix helped bring forth important federal legislation, an ambitious effort born of her relentless advocacy, known as the Bill for the Benefit of the Indigent Insane. She submitted an extensive memorial to the U.S. Congress, which was formally introduced by supportive senators since she could not present the bill herself.



Depiction of East Cambridge Jail where Dorethea Dix volunteered to teach before the Civil War. Library of Congress.

This background shaped her approach to wartime nursing. She believed deeply in humane treatment, not only for the wounded but for anyone suffering, physically or psychologically. Her insistence on discipline was not about rigidity for its own sake; it was about creating an environment where patients were treated with dignity by professional caregivers. She expected her nurses to uphold high moral and professional standards because she understood how quickly vulnerable people could be dehumanized in institutional settings. Her experiences in asylums had taught her that systems without oversight or compassion could easily become places of neglect, further setting the stage for professional nursing.

Dix's pre-war advocacy also gave her a unique perspective on the psychological toll of conflict. Although the Civil War predates modern understandings of Post Traumatic Stress Disorder (PTSD), she recognized that soldiers experienced emotional and mental suffering that required attention. She encouraged nurses to provide comfort, conversation, and reassurance, forms of care that today we might describe as trauma-informed. While she did not have the language or clinical frameworks we use now, she understood that healing involved more than bandages and medications, something that has been inherent to nursing for centuries.

While Dix broadly contributed to the advancement of the profession, one of her most enduring influences on modern nursing lies in the role of advocacy. Nurses today are often the first to recognize where advocacy is needed due to a variety of unique needs including: mental health stigma, lack of access to care, or systemic barriers. This is especially true in military and veteran populations, where the "invisible" wounds of war remain a persistent challenge. Service members and veterans continue to face stigma that discourages help-seeking, and many still struggle to access timely, culturally competent mental health care. The barriers may look different than those Dix confronted in the nineteenth century, but the underlying issues of marginalization, misunderstanding, and inadequate systems, remain relevant.

Dix's example offers a model for how nurses can confront these challenges. She did not wait for permission to advocate for the vulnerable. She gathered evidence, confronted policymakers, and demanded change. Her work reminds us that advocacy is not an optional part of nursing; it is a core responsibility. When nurses speak up in clinical settings, policy discussions, or public forums, they carry forward a tradition that Dix helped curate. Currently, Army Medicine has identified critical mental health gaps that must be addressed to meet the demands of the future fight, specifically the ability to diagnose, treat, and prevent psychiatric casualties. Dix's legacy reminds us that understanding where we have been is essential to preparing for where we must go, especially as we confront the emerging mental health care gaps.

As we consider how to strengthen mental health care today, several recommendations emerge from the principles that guided Dix's work. First, integration of care remains essential. Just as Dix fought to bring humane treatment into institutions that had long neglected it, modern healthcare systems must continue to integrate behavioral health into settings that are accessible to soldiers such as primary care, or embedded directly in units. Collaborative models reduce stigma by making mental health services a routine part of healthcare rather than a separate, siloed specialty. For military populations, integrated care can help normalize help-seeking and ensure that mental health concerns are identified early.

Second, trauma-informed care reflects the humane philosophy that Dix championed. She understood that suffering, whether physical or psychological, required compassion and structured care. Today, trauma-informed approaches emphasize safety, trust, empowerment, and cultural sensitivity. These principles are especially important in the military setting, where patients may carry experiences of combat, loss, or institutional betrayal that are specific to their military roles, and need providers who understand that nuance.

Third, technology and telehealth offer new avenues for expanding access to mental health care. Telehealth can reduce stigma by allowing patients to seek help privately, without the fear of being seen entering a clinic or being judged by peers. It also increases access for service members in remote locations or those hesitant to engage in traditional therapy. While Dix could not have imagined such tools, she would have recognized the value of any innovation that expanded care to those who needed it most.

Fourth, policy and advocacy remain critical. Dix spent years lobbying legislatures to diagnose mental health patients, and build state hospitals with improved conditions that accommodate their needs. Today's nurses can influence legislation related to mental health funding, staffing standards, suicide prevention, and soldier and veterans' services. Whether through professional organizations, testimony at hearings, or participation in public health campaigns, nurses are well-suited to shape the systems in which they work.

Finally, leaders must role model help-seeking behavior. One of the most persistent barriers to mental health care in military communities is the belief that seeking help is a sign of weakness. Leaders who openly discuss mental health, share their own experiences, or encourage their teams to access care help dismantle this stigma. Dix understood the importance of leadership by her own example. She led in a male-dominated environment with resilience and uncompromising courage. Her strict standards set a tone that prioritized dignity and professionalism.

The enduring legacy of Dorothea Dix is not confined to the Civil War era. Her work laid the foundation for nursing advocacy, demonstrating that nurses could lead, organize, and reform systems at the highest levels. She showed that compassion and discipline are not opposing forces but complementary elements of effective care. Her efforts in the face of resistance continue to inspire nurses who navigate complex healthcare environments today. Her work as superintendent also propelled the evolution of Army nursing, creating the momentum that allowed the profession to grow into the highly trained, fully professional nursing force we recognize today.

Dorothea Dix's leadership during the Civil War and her tireless advocacy for the mentally ill, created a foundation for both the professional Army nurse and modern nursing's role in combating stigma. Her example challenges us to continue the fight she began; to advocate for systemic reform and to embrace advances in mental health care that expand access and reduce suffering. In honoring Dix's work, we honor the values that define Army nursing: compassion, courage, and an unwavering commitment to those placed in their care.

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— 27 July 1775 —

Highlights from the AMEDD Museum Collection: Surgeon William Newton

Paula Ussery and Chuck Franson



This frock coat was worn by Surgeon William S. Newton. The uniforms worn during the American Civil War were officially adopted in June 1851. AMEDD Museum.

The Army Medical Department (AMEDD) Museum is fortunate to have in its artifact collection the frock coat and medical officer's sash of Assistant Surgeon William Newton. Newton was a native of Ohio born on February 6, 1823, near the small town of Harmer, in Washington County, Ohio. In 1839 he enrolled in a series of educational courses in Marietta, Ohio. The first, Marietta College's Latin School, was a preparatory school for adolescent students. After two years of study, he advanced in the fall 1841 to the Marietta Academy, a preparatory school for the college. The following fall, Newton enrolled as a freshman at Marietta College. He completed his freshman year, 1842 and 1843, but he did not continue his studies after his first year.

Newton had developed an interest in medicine from his cousin Robert Safford Newton, who practiced medicine in Gallipolis and had trained in the new field of "eclectic" (characterized by its noninvasive therapies and use of plants) medicine. Newton enrolled as a medical student in the fall of 1843 at the Medical College of Ohio in Cincinnati. The college had been founded in 1819, and classes were offered in physics, surgery, and the auxiliary sciences. The departments were Anatomy, Surgery, Materia Medica, Obstetrics and Diseases of Women and Children, Chemistry, and Theory and Practice of Medicine. Newton graduated in 1845 and returned to Harmar where he began working alongside Seth Hart, a doctor in town, which served as his residency or apprenticeship. By 1850 Newton had opened his own medical practice. In 1854 he and his family relocated to Ironton, Ohio, serving as the eighth doctor in Ironton at that time.

The young doctor volunteered for service in August 1862. He served all but two short periods with the 91st Regiment of Ohio Infantry, formed from men of Adams, Scioto, Lawrence, Gallia, Jackson and Pike Counties. The unit was initially sent to Ironton, Ohio and to Guyandotte, Virginia to repel a rumored attack by Confederate Brig. Gen. Albert G. Jenkins who eventually did lead a raid into West Virginia and Ohio in September 1862. In that same month the 91st was formally mustered into the service of the United States and sent to Point Pleasant, (West) Virginia.

Like hundreds of thousands of his fellow volunteers, Newton had never served in the Army previously. In addition to himself, Assistant Surgeon John B. Warwick and Surgeon George H. Carpenter served as the three surgeons of the 91st Infantry Regiment, which in theory, consisted of 1,000 men, organized into 10 companies of 100 men each.



The regulation stated: "All officers shall wear a frock-coat of dark blue (wool) cloth, the skirt to extend from two-thirds to three-fourths of the distance from the top of the hip to the bend of the knee; single-breasted for Captains and Lieutenants; double-breasted for all other grades." His coat is closed via seven pair of staff buttons decorated with an eagle and stars. The coat has a quilted chest and two concealed pockets in the back of the skirt. The shoulder straps are for a Major. AMEDD Museum.

The only other dedicated medical personnel in the regiment were enlisted hospital stewards. Nurses and orderlies were usually detailed soldiers. According to the 1861 Army Regulations, "Cooks and nurses will be taken from the privates, and will be exempt from other duty, but will attend the parades for muster and weekly inspection of their companies. . ." (This system was eventually replaced in 1887 with the creation of the Hospital Corps for enlisted Medical Department soldiers.) The regulations also stated that "for one company one steward, one nurse, and one cook were to be detailed. For each additional company one nurse; and for commands of over five companies one additional cook."

One of Newton's daily duties was to staff "sick call." He described this process for his wife in 1862, ". . . for surgeon's call, every morning, at which time the orderly of each company march all that complain to receive medicine or be sent to the hospital, the average number is about 40." The 1861 regulation described this process as well:

At surgeon's call the sick then in the companies will be conducted to the hospital by the first sergeants, who will each hand to the surgeon, in his company book, a list of all the sick . . . on which the surgeon shall state who are to remain or go into hospital; who are to return to quarters as sick or convalescent; what duties the convalescents in quarters are capable of; what cases are feigned; and any other information . . . he may [need] to communicate to the company commander.

The surgeon examined the patients and some of those examined were admitted to the hospital. As far as possible local buildings were requisitioned to be used as hospitals. In the absence of structures, the hospital would be housed in canvas tents. The regulations allowed one common tent 14 feet in length, 15 feet in width and in height 11 feet with a wall of 4 1/2 feet per company. One Sibley tent was also authorized per company. Patented in 1856 the Sibley tent was conical and comfortably housed 10 to 12 men. For those patients admitted to hospital, Newton made rounds once in the morning and once in the evening.

The 91st participated in Brig. Gen. George Crook's raid in Southwest Virginia in May 1864 to destroy the Virginia and Tennessee Railroad that ran from Lynchburg, Virginia to Bristol, Tennessee. They also participated in the 1864 Shenandoah Valley campaign led by Maj. Gen. Phillip Sheridan including the Third Battle of Winchester, and Cedar Creek.

The raid into southwest Virginia led to one of Newton's most harrowing experiences. Crook's column containing three brigades of the Army of West Virginia pushed south into Virginia from West Virginia. Troops from Confederate Brig. Gen. Albert G. Jenkins attacked these forces on May 9, 1864, at the Battle of Cloyd's Mountain and after hand-to-hand combat were repulsed. Newton and three other surgeons were ordered to remain on the battlefield and tend to the wounded. Newton cared for both U. S. Army and Confederate soldiers and even operated on Brig. Gen. Jenkins who had been wounded. Left on the field for three weeks, Newton and the other surgeons were captured by the men of Brig. Gen. John Hunt Morgan. During this time, he was "compelled to sleep in the open air, without clothing, his own having been taken by the enemy, [consume] unhealthy food all combined [into] a case of dysentery and piles, the liver became torpid, complexion sallow and remains so." Newton was then sent to Libby Prison. Fortunately, he was confined there for only three days before being exchanged under a flag of truce.

When his regiment was actively campaigning Newton wrote that an assistant surgeon's responsibility during a skirmish was to prepare for the expected casualties. He had to ready the operating instruments and made preparations for incoming wounded. In a letter to his wife Newton commented during the Shenandoah Valley Campaign of 1864 that "he had performed twenty-five or thirty amputations." This total included both U. S. Army troops and Confederates.

Newton was also responsible for sanitation of the camp, ensuring that the rations issued to the troops were properly cooked and for the various reports required by the U. S. Army. Among the forms were a: morning report, register of patients, requisition for medical supplies, return of medical and hospital property, prescription book, diet book, case book, monthly and quarterly report of sick and wounded and deaths, and the statement of hospital funds.

Assistant Surgeon William Newton served with the 91st until October 1863 when he was assigned to the 2nd West Virginia Cavalry as Acting Surgeon. Newton returned to the 91st in February 1864 and remained with them until March 18, 1865, when he became Surgeon of the 193rd Ohio Volunteer Infantry Regiment. He was mustered out of the Army with the 193rd Ohio on August 9, 1865, having served for three years and four months.



A silk net sash was worn over the frock coat. As the branch color of the Army Medical Department was emerald green, the medical officer's sash was green. The sash was to wrap twice around the waist and was to tie behind the left hip. AMEDD Museum.

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— 27 July 1775 —

Dr Samuel Wylie Crawford: The Surgeon-Soldier at Fort Sumter Christopher Hohman

"The Recent Occupation of a New Country...": Dr Crawford's Antebellum Frontier Service

Samuel Wylie Crawford was born c. 1827 to Rev. Dr Samuel Wylie and Jane Agnew Crawford in Franklin County, Pennsylvania. In 1846, he graduated from the University of Pennsylvania's Medical School, and by 1850, Dr Crawford resided in Philadelphia's North Ward along with his parents and younger brother.

In 1851, Crawford sought admittance to the U.S. Army Medical Department. At that time, the Army Medical Department was a difficult institution to join. Doctors seeking admittance to it had to pass a challenging entrance exam administered by a panel of several surgeons over three days. Nevertheless, Crawford passed his exam and earned admittance to the Army Medical Department as an assistant surgeon.



Assistant Surgeon Samuel W. Crawford, shown here in his service as a member of the Army Medical Department. Dr

Crawford would eventually receive a commission in the infantry and fought at Antietam and Gettysburg. National Library of Medicine.

Assistant Surgeon Crawford's first assignment was in Texas. In 1852, he joined the men of the 8th United States Infantry Regiment in establishing Fort McKavett, Texas in the San Saba Valley. Crawford later described the medical challenges soldiers faced during the fort's construction, confiding to Surgeon General Lawson that, "Miasmatic diseases have been very prevalent during the summer and fall months." Crawford believed that "the recent occupation of a new country, the exposure at night in tents, exposure to the night air, and existence of large bodies of water in the vicinity contributed to the existence of these affections."

"Proceed Forthwith to Fort Moultrie...": Dr Crawford's Arrival in Charleston Harbor

In September 1860, while on leave from frontier duties, Dr Crawford received orders from the Secretary of War instructing him to, "proceed forthwith to Fort Moultrie, South Carolina and report for duty to the commanding officer of that station."

Crawford quickly embarked on a train for Charleston, South Carolina. As his train thundered south, he pondered his sudden reassignment, later writing that, "there was time for earnest reflection as to the cause which so suddenly interrupted my visit and sent me to the far South in a sickly season." Crawford soon overheard from his fellow passengers that yellow fever was present in Charleston, and that it had killed the surgeon at Fort Moultrie in Charleston Harbor. "So," he later wrote, "I was on my way to take the place of an officer of my corps who had died at his post, in attendance, possibly, on an epidemic of yellow fever."

Crawford had much to fear from yellow fever. The mosquito-borne illness had plagued Charleston before, having struck the city in epidemic form as recently as 1858. As he traveled south,

the city was preparing for yet another potential outbreak. By September 1860, newspapers such as *The Charleston Daily Courier* reported "sporadic cases of yellow fever" in the city. When Crawford arrived in Charleston at the end of the month, residents were still highly anxious about the presence of a disease with which they were all too familiar.

The morning after his arrival in Charleston, Dr Crawford made the short trip out to Fort Moultrie in Charleston Harbor. Located on the sandy beach of Sullivan's Island near the sea, the fort was "a low water battery built of brick, sixteen feet high, with one tier of guns *en barbette*, some bearing directly upon the channel, that ran within short range of its walls." The fort was garrisoned by two companies of the 1st Regiment of U.S. Artillery commanded by Lt. Col. John L. Gardiner.

Upon his arrival, Crawford visited the bedside of the commanding officers' ill servant. The man had cared for his predecessor before falling ill himself, presumably with yellow fever. Crawford, however, offered a different diagnosis, later writing, "Fortunately there was no yellow fever. The epidemic changed to one of 'broken bone fever' or 'dengue.' Dengue was another mosquito-borne illness characterized by both fever and nausea in its earliest stages and then by vomiting and a rash. "It affected the entire community," Crawford later wrote, "but without fatal results in any case."

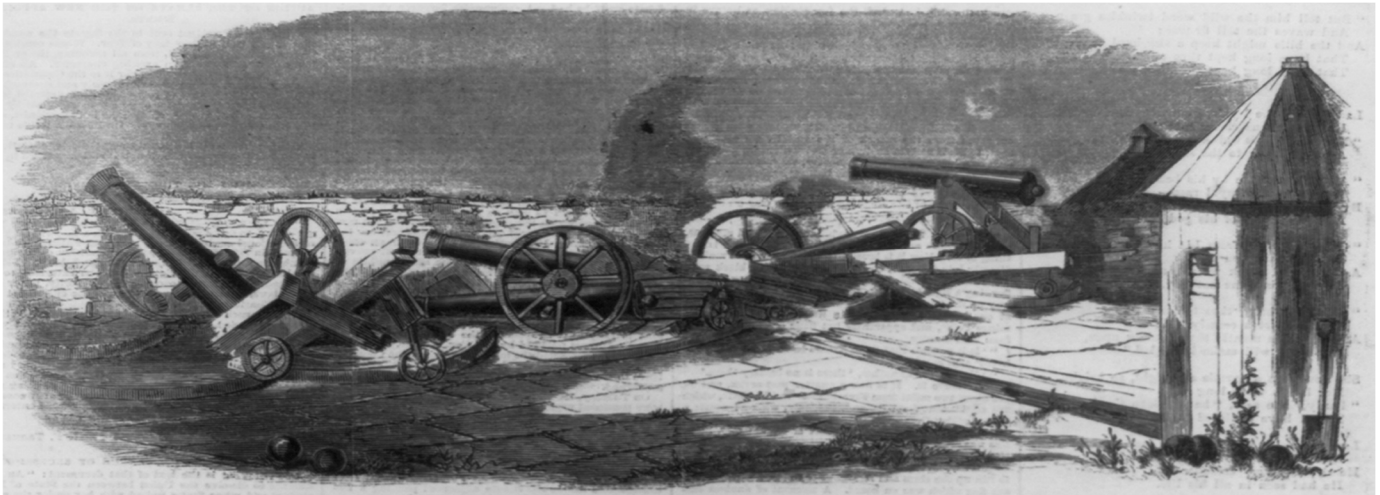
While Charleston did not experience a major yellow fever epidemic in the fall of 1860, Crawford and his companions at Fort Moultrie had more to fear than epidemic disease. The 1860 presidential election heightened tensions across the nation, as Southern fears about the future of slavery in the case of a Lincoln victory, propelled many southerners to call for secession. When Lincoln won that November, the stage was set for a confrontation between federal authorities and the rebellious, saber-rattling Southern states. Unfortunately for Dr Crawford and his companions, that confrontation ignited in Charleston Harbor.

“I Never in my Life Believed that Such Hatred Could Be Exhibited To the Union”: The Crisis Deepens

Federal soldiers' position at Fort Moultrie in Fall 1860 was precarious. Their relations with Charlestonians had devolved rapidly from one season to the next. In the summertime, relations between the soldiers and civilians had “been ever of the most agreeable character,” and the parapet at Fort Moultrie, “was the daily promenade of the fashionable throng.” By November, in the wake of Lincoln's victory, things had changed drastically. “Let me assure you,” Dr Crawford confided to his brother in December, “that this state is in revolution. I never in my life believed that such hatred could be exhibited to the Union.” In Crawford's view, the time for reconciliation had passed, as he explained, “The time for argument my dear brother is past and past forever, and you and I have lived to see the saddest sight that will ever be witnessed by man.” Finally, Crawford predicted that war was imminent. “There would be no gentle disengagement,” he posited, “We are preparing for war with these mad Carolinians.”

On December 20, 1860, South Carolina became the first state to secede from the Union. From the parapets of Fort Moultrie, soldiers watched as the night sky above Charleston lit up with fireworks. The fort around them was dark, damp, and quiet. As he watched the spectacle unfold, Major Robert Anderson, commander of federal forces in Charleston Harbor, feared that an armed confrontation between his men and South Carolina forces was imminent. Not only would such a confrontation be disastrous for his small, vulnerable garrison, but it would also plunge the nation into civil war. There was only one hope to avoid violence and stave off a war: evacuation to Fort Sumter.

“From its very origin,” Dr Crawford wrote in 1887, “Fort Sumter seemed destined to notoriety.” The fort's construction first begun in 1829, and by 1860, the giant, brick pentagonal sea fortress dominated the entrance to Charleston Harbor with its 50 ft walls and three tiers for gun placements. However, even after 31 years of construction, the work remained incomplete. As late as December 27, guns still had to be placed and 41 holes in the second gun tier still needed to be fashioned into embrasures. If Fort Sumter could be completed and occupied by a suitable force, it could become a formidable fortress for whichever side controlled it.



Group of guns and gun carriages dismantled by Major Anderson at Fort Moultrie, Harper's Weekly. Library of Congress.

“I Intend to Move to Sumter Tonight”: The Flight to Fort Sumter

Six days after South Carolina's secession, Major Anderson put a daring plan into action. It was so secret that his officers were unaware of his intentions until the last moment. Dr Crawford learned of the gambit upon his return from a trip to Charleston. He found Major Anderson atop Fort Moultrie's parapet watching the harbor channel. Crawford spotted a steamer of the Savannah Line passing southward and which looked primed to enter the harbor. He pointed it out to Anderson, who watched the vessel with “great earnestness.” He then turned to Crawford and said, “I hope she will not attempt to come in. It would greatly embarrass me. I intend to move to Fort Sumter tonight.” Crawford's mind shifted immediately to the hospital department of which he was the head. Major Anderson told him that Moultrie's hospital stores would remain behind until the following morning because these were less likely to be disturbed by hostile troops than other more essential supplies that needed to be transferred to Sumter immediately.

Crawford was stunned by Anderson's plan. Captain Abner Doubleday, commander of Company E, 1st Artillery, encountered Crawford on Fort Moultrie's parapet shortly after the major had shared his designs with the assistant surgeon. Doubleday remarked to him, “it is a fine evening, Crawford.” In Doubleday's words, “he replied in a hesitating

and embarrassed manner...showing that his thoughts were elsewhere.” Indeed, the flight to Fort Sumter was set to begin soon.

The movement to Fort Sumter began shortly after dusk. Major Anderson intended to transfer his command, 85 officers and men total, in two groups of three boats each. This was easier said than done because two guard boats patrolled the harbor between Forts Moultrie and Sumter to prevent Moultrie’s garrison from moving to the latter. For Anderson’s plan to work, his boats would have to evade these vessels-land safely at Sumter-then return for the next group. The first group set off after sunset, with the moon visible in the northeast sky. Two boats were commanded by engineering lieutenants while a third was overseen by Captain Doubleday.

To protect the boats, Major Anderson left Dr Crawford and a small contingent of men behind at Fort Moultrie. Together, they manned one of the post’s largest cannons, now fully loaded, with orders to fire on the patrol boats if they attempted to interfere with the crossing. Crawford and his companions watched tensely from a telescope as one of the patrol boats passed near the three boats. The two forwardmost boats changed course, however, Captain Doubleday’s craft continued its course. Crawford described the scene: “The steamer passed close by-within a distance of 100 yards-but instead of being upon her ordinary mission she was in the act of towing a vessel to the harbor.” Doubleday’s quick thinking, having his men conceal their arms, uniforms, and accoutrements to appear as laborers, prevented their raising suspicion.

By 8:00 P.M., the only men left at Fort Moultrie were those who had stayed behind to disable guns and destroy ammunition left behind during the transfer. Dr Crawford watched as soldiers spiked Moultrie’s big guns and cut the post’s flagstaff, which promptly fell on the parapet and into the manmade ditch below, before he departed for Fort Sumter. Early the next morning, he returned to Fort Moultrie to transfer his medical stores to Fort Sumter.

As he approached Fort Moultrie, “a heavy column of smoke appeared above the parapet.” He found men hard at work destroying gun carriages. Crawford proceeded to help them destroy five additional carriages before turning his attention to the medical stores. By the end of the day, he estimated that a year’s worth of hospital supplies and 1 1/2 of provisions had been successfully transferred to Fort Sumter.

“We Are Left to Ourselves and Our Own Exertions...”: Life at Fort Sumter

Over the next four months, the garrison at Fort Sumter settled into their new command. Officers such as Dr Crawford lived in large, well-ventilated quarters of three stories each. Dr Crawford believed that “the quarters had a war-like expression.” Crawford’s medical duties were light throughout this period. As a result, he volunteered for duties not expected of medical officers. Captain Doubleday recalled one instance during which, “Assistant-surgeon Crawford, having no sick in hospital, generously offered to do duty as officer of the day, and his offer was gladly accepted.” Dr Crawford also ran the commissary and quartermaster departments when necessary. In January 1861, while inventorying provisions, he noted that, “instead of a six months’ supply of flour, there was scarcely four and that it would be necessary to place the command on half rations of coffee and sugar and deprive the officers temporarily all together.”

Dr Crawford helped the garrison prepare for the battle they feared was inevitable. On March 9, 1861, the men were placing one of the fort’s columbiads, a massive 10-inch, 15,000 lb. gun, using an impromptu block and tackle system. When the gun was mid-lift, the machine broke. Crawford later wrote to his brother, “down it came. It went into the ground butt foremost and buried itself to the trunnions.” Fort Sumter’s garrison chose to use the buried gun as a make-shift mortar battery. The work and stress took a toll on the assistant surgeon who confided to his brother in February that, “My throat still burns like a coal and my general health for the first time in my service is not good. My heart is sad at the condition of the country and as far as I can see there is no prospect of better times. Crawford could not have been more correct.

While the men at Fort Sumter busied themselves preparing for the coming battle, the Union fractured around them. More states joined South Carolina in secession while the federal government in Washington D.C. left its garrison at Fort Sumter to their own devices. In February, Crawford vented his frustrations, complaining to his brother about how President Buchanan’s “don’t initiate policy” prevented Fort Sumter from receiving much needed reinforcements and supplies. With bitterness, he penned, “We are left to ourselves and our own exertions as a sacrifice to turn public opinion against those who attack us, and then if possible save the border states and the Union.” “But,” he continued, “there is a power behind the throne, the first gun fired at our fort will call the country to arms; the bugle that sounds the attack upon us will echo along the slopes of the Alleghenies, and the granite hills of the North, along the shores of the great lakes, and far away on the rolling prairies of the west and the earth will shake with the tread of armed men.”



Bombardment of Fort Sumter, Charleston Harbor: 12th & 13th of April, 1861. New York: Currier & Ives, circa 1861. Library of Congress

“The Scene was Wellnigh Indescribable”: The Bombardment of Fort Sumter

The crisis at Fort Sumter reached its zenith in April 1861. On April 10, the garrison was placed on half-rations, and the men had only two days of food left. Under these conditions, no food went uneaten. Dr Crawford confided in his journal that, “The major counsels economy and will not permit any crumbs to be left on the plates.” According to Crawford, the men were eating, “One cracker to a man morning and night—none at dinner. For supper, rice and coffee.”

The federal garrison at Fort Sumter would be starved out in just a matter of days. However, Confederate forces in South Carolina could not wait that long. Word of a relief expedition for Sumter, sent by the recently inaugurated Lincoln administration, prompted Confederate forces to action. At 3:30 A.M. On April 12, 1861, Confederate emissaries gave Major Anderson a final notice: Confederate bombardment of Fort Sumter would commence at 4:20 A.M. that morning.

True to their word, Confederate artillery began bombarding Fort Sumter at 4:20 A.M. The fort’s garrison waited until daybreak to return fire. At 7:00 A.M., Fort Sumter’s guns, numbering 53 in total, opened in response. For the next 36 hours, Fort Sumter was battered by Confederate guns which fired 3,341 projectiles during the bombardment. Sumter’s garrison returned nearly 1,000 of their own balls and shells and balls of their own. Dr Crawford, who had established a makeshift hospital in one of the fort’s casemates, once again was more soldier than surgeon. Placed in command of one of the fort’s batteries, he initially oversaw the firing of three 32 pounders bearing upon one of the floating batteries at the upper end of Sullivan’s Island. The effect the fire produced was, “slight. Nearly all of the shot failed to penetrate the roof, and were deflected.” After receiving permission from Major Anderson to relocate his command, Crawford’s detail began firing several guns aimed at Fort Moultrie. He and his men maintained their fire for four hours before being relieved.

The Confederate bombardment left Fort Sumter badly damaged. “The scene,” Crawford later wrote, “was wellnigh indescribable.” At noon on April 13, Confederate batteries continued hammering Sumter’s thick walls so “that there was scarcely an appreciable moment that shot and shell were not searching the work.” The near constant fire ignited fires in the wood structures of the fort. The flames spread unchecked, consuming the quarters, “shooting upward amid the dense smoke as heavy masses of brick and masonry crumbled.” With Fort Sumter burning, Confederate military leaders wondered if their erstwhile countrymen had had enough.

Later that day, Confederate commissioners arrived at Fort Sumter under a flag of truce to confer with Major Anderson about his surrender terms. The men met in one of Sumter’s casemates that was then being used as Dr. Crawford’s quarters. As Major Anderson wrote out his terms, an incident “which might have had a serious ending” occurred. One of the dignitaries, Colonel Roger A. Pryor, sat down at a table near the head of Dr. Crawford’s camp-bed. The surgeon had been seriously ill recently and had medicine out on the table for his treatment. “Without reflection,” Crawford later wrote, “Colonel Pryor poured out a large portion of the medicine and drank it.” Realizing his mistake, Colonel Pryor appealed to Major Anderson about what he had ingested. The major immediately summoned Dr. Crawford, who after listening to the colonel’s story, told him, “If you have taken the amount of that solution you think you have, you have likely poisoned yourself.”

“Do something for me, doctor, right off,” Colonel Pryor requested, “for I would not have anything happen to me in this fort for any consideration.” The surgeon took him to his makeshift hospital, tucked away in another of the fort’s casemates where he was promptly treated and sent back to Charleston. Meanwhile, Major Anderson finished laying out his terms for a surrender of Fort Sumter.

The next day, April 14, 1861, Dr. Crawford and the rest of the garrison surrendered Fort Sumter. They departed only after their salute to the flag ended in tragedy. The premature discharge of one of the guns, and a subsequent explosion, killed two men and wounded four others. It was just a small sample of the bloodshed and death that was to come over the next four years. The American Civil War had begun.

“His Ambitions To Win A Name As A Soldier...”: Conclusion

On April 18, 1861, Dr Crawford wrote his official casualty report from the steamer *Baltic*. He listed four men wounded during the bombardment itself and six others killed and wounded during the final salute. This document may have been one of the final documents he created as an assistant surgeon in the U.S. Army Medical Department. His actions at Fort Sumter demonstrated his eagerness to assume more martial duties. A month after Sumter, he resigned from the medical department and accepted a commission as a major in the 13th Infantry. Captain Doubleday summed up Crawford’s intentions the best when he wrote, “His ambition to win a name as a soldier, soon induced him to quit the ranks of the medical profession.” After his resignation, Dr Crawford never returned to the medical field.

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— 27 July 1775 —

Birth of Wound Antisepsis

LTC Brandon Hulette

Infections during the initial hospital care of combat casualties have been a significant issue for military medicine. Indeed, some studies indicate that as many as 34% of combat casualties from Iraq and Afghanistan developed infections during their initial hospitalizations, although in the modern era, antibiotic and advanced hospital care help most patients recover from these infections. During the Civil War however, these infections, collectively known at the time as “Hospital gangrene,” were a scourge that killed 38-62% of surgical patients in hospitals on both sides.

It is in that context that Dr Middleton Goldsmith, a federal Army surgeon pioneered the use of bromine to treat wound infections, single-handedly inventing modern wound antisepsis some ten years before the germ theory of disease was popularized, saving countless lives in Civil War hospitals.

Goldsmith was born in Port Tobacco, Maryland in 1818, the son of surgeon Alban Goldsmith. Alban was a founder and professor of Surgery at the Kentucky School of Medicine in Louisville in the mid-1830s, and during this time, Middleton served as his anatomical and surgical assistant. Middleton enrolled in the New York College of Physicians and Surgeons in 1837 and graduated in 1840. By 1844 Middleton became Chair of Surgery at Castleton Medical

College in Vermont, and after 12 years there, he succeeded his father as Chair of Surgery at Kentucky School of Medicine, soon becoming the Dean of Faculty.

He joined the Federal Army at the outbreak of the Civil War as a Brigade Surgeon and was quickly appointed Surgeon-in-Chief of all military hospitals in Kentucky and several in Tennessee, including those in occupied Nashville. Goldsmith held this post for the duration of the war, supervising the growth of Nashville's military hospital system to a vast network of over 25 facilities treating tens of thousands of patients from across the vast expanse of the western theater of the Civil War.

During his tenure, Goldsmith sought to address one of the biggest killer of soldiers in military hospitals of the time, hospital gangrene. As the war raged on, amputations became common for the thousands of battlefield injuries that were a consequence of America's bloodiest war. While these amputations, especially when performed relatively soon after an injury, were effective at preventing death from the horrific wounds created by the weapons of the time, period records show that many patients went on to develop gangrene, erysipelas, or pyemia, collectively known as hospital gangrene, often spelling death for the wounded. In an era before either the germ theory of disease, or even basic microbiology were known, there were few, if any, effective treatments for these complications.

Ever the academic, Goldsmith reviewed numerous case reports of patients in his hospitals as well as the medical journals of the time and noted that the curative agents then in use, which included corrosive acids such as nitric acid, stopped the gangrene but were also very destructive of living tissues and impossible to administer safely. He also noted that other topical remedies like poultices did not arrest the infection and other treatments like the consumption of coffee and whiskey did nothing.

Goldsmith did notice however that in hospital wards where bromine was used as an aerosolized deodorant to destroy "Miasmas" or a noxious form of "bad air" thought to contribute to the development of a wide range of diseases, gangrene patients seemed to recover slightly more often than in other wards. Given the frequency with which hospital gangrene occurred, and the devastating consequences when it did, any improvement in outcomes from this illness, however slight, could be of great benefit to a significant number of patients, so Goldsmith began to look into the use of bromine to improve patient outcomes. Recognizing that bromine seemed to work better when applied directly to surgical wounds rather than when aerosolized by spraying or burning, he developed a method of applying bromine deep into muscular layers after wound debridement as well as injecting bromine subcutaneously and applying it topically to exposed surfaces.

His technique provided results that were nothing short of miraculous with only 3 of 104 patients given bromine treatment dying and those 3 dying of pyemia and cellulitis after the gangrene was improved. It was also noted that those patients who recovered after having other treatments averaged 15 days convalescence, those with weak bromine 9 days, and pure bromine only 2 days. He rapidly shared the procedure and the formula for his bromine solution with other surgeons in his hospital system who began to see similar results. As he continued to use this new treatment in Nashville and area hospitals, other physicians, including some not employed by the military, who saw patients treated with Goldsmith's bromine were amazed at its ability to improve the fortunes of seemingly untreatable patients and began to encourage others to make use of the new treatment. Dr R. S. Stanford, a Surgeon in the U.S.V. also practicing in Goldsmith's hospitals wrote an article for both the *American Medical Times* and *The American Journal of Medical Sciences* relating that he too had used Goldsmith's Bromine preparation and noted how it arrested the gangrenous process at the first application even when other treatments had failed. He went on to write "I can say to the profession with unbounded confidence that we have in bromine an agent which when properly applied to gangrenous ulcerations, cure them in every instance with more certainty and quinine cures intermittent fever."



Hospital gangrene of an arm stump from the *Medical and Surgical History of the War of the Rebellion*. National Library of Medicine.

Dr Goldsmith's patient records showing the benefits of his use of Bromine published in 1863. History of Medicine Collections, Special Collections and University Archives, Vanderbilt University.

Dr Goldsmith's patient records showing the benefits of his use of Bromine published in 1863. History of Medicine Collections, Special Collections and University Archives, Vanderbilt University.

Dr Goldsmith's patient records showing the benefits of his use of Bromine published in 1863. History of Medicine Collections, Special Collections and University Archives, Vanderbilt University.

After leaving Louisville, Goldsmith returned to Vermont where he did not resume his practice but did keep up a voluminous correspondence on all things medical and consulted with numerous physicians on modern treatments, including his bromine techniques, until his death in 1888.

Ultimately Goldsmith was overshadowed by the widely publicized work of British surgeon Joseph Lister who pioneered the use of carbolic acid (modern-day phenol) as a disinfectant for surgical instruments, patients' skins, sutures, surgeons' hands, and wards by 1867 and the work of Louis Pasteur who developed the germ theory of disease in the 1870s.

Middleton Goldsmith's work preceded both Lister and Pasteur by several years and was based on solid clinical evidence gained from the hospitals at Nashville, demonstrating what can be achieved with an inquiring mind even when complete understanding of a condition is lacking. Unfortunately, little beyond his initial report to the Surgeon General of the Army was published and gradually Goldsmith's contribution was largely forgotten. Today very little outside of a few academic articles and websites mention this pioneer of medical practice, and his landmark innovation during one of the pivotal periods in American history.

Goldsmith made his formula and procedure widely available going so far as to publish the preparation and procedure in local newspapers and assisting other physicians with its use. However, he also realized that in an era when physicians didn't agree on or fully understand the causes of these illnesses, such remarkable improvement would be met with skepticism. As such he invited other surgeons, especially those from outside his command, to not only view the patients' records, but to come to Nashville hospitals and see patients for themselves. One of these surgeons, G. R. Weeks, authored an independent report on what he had seen, verifying Goldsmith's records and reports and even concluding that the treatment was 100% successful, an exaggeration, but testament to the marked improvement over expectations of the time. Ultimately case reports of physicians using Goldsmith's technique began to appear in a wide variety of medical publications, and on May 20, 1863, his findings were presented to the New York Academy of Medicine.

The bright surgeon thoroughly documented his investigations in 1863 in a published report to the Surgeon General of the Army entitled *A Report on Hospital Gangrene, Erysipelas and Pyaemia, as observed in the departments of the Ohio and the Cumberland, with cases appended*. This report, an original copy of which is in the Vanderbilt History of Medicine collection, included detailed case reports and a foldout table containing all his research data, as well as his correspondence with other surgeons, one of the most complete investigations of the time. His precise data collection and reporting allowed him to claim near-complete eradication of hospital gangrene from his wards with only 8 of his 304 patients receiving bromine-based therapy dying, a mortality rate of 2.6%, far less than the overall mortality of hospital gangrene cases from the Civil War of 45.6 %.

Goldsmith's findings were less well-publicized in the Confederate Army where, although surgeons did begin to realize the importance of topical treatments, they continued to use prepa-

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— 27 July 1775 —



Highlights from the ACHH Research Collection

Carlos Alvarado

Among the items in the ACHH research collection are three images of Dr. B. W. (Benjamin Walter) Carpenter, one *carte de visite* and two tintypes. Dr Carpenter was born in Randolph, Vermont on October 21, 1836. He studied medicine at the University of Vermont, and upon his graduation in 1857 spent the next four years in private medical practice. Between June 1861 and November 1864, Dr Carpenter held several positions within the Union Army including Assistant Surgeon with the 2nd Vermont Infantry Regiment and Surgeon with the 9th Vermont Infantry Regiment.

The Letterman Plan: From Battlefield Blueprint to Emergency Medical Care



Original artwork by Fran Trachta. U.S. Army Medical Department Museum

An exciting documentary is in the works from Letterman Legacy LLC through Victory Village (<https://www.vvets.org/>), a non-profit veteran community organization that will highlight the story of Surgeon Jonathan Letterman in the American Civil War. Considered the Father of Modern Battlefield Medicine and Emergency Medical Services, little is known about Letterman except by a few within military medicine. Letterman's legacy goes far beyond the Civil War. Most people today see his influence everyday but do not realize it. This story aims to change that.

See the proof of concept video:

<https://youtu.be/4pInGStgkpc>

Keep up with "behind-the-lens" updates on social media:

<https://www.facebook.com/SurgeonLetterman?mibextid=wwXIfr&mibextid=wwXIfr>

Writing for *The AMEDD Historian*

We are seeking contributions! We believe variety is the way to attract a variety of audiences, so we can use:

- Photos of historical interest, with an explanatory caption
- Photos of artifacts, with an explanation
- Documents (either scanned or transcribed), with an explanation to provide context
- Articles of varying length (500 word minimum), with sources listed if not footnotes/endnotes
- Book reviews and news of books about AMEDD history

Material can be submitted usarmy.jbsa.medical-coe.mbx.office-of-medical-history@army.mil Please contact us about technical specifications.

The opinions expressed in The AMEDD Historian are those of the authors, not the Department of War or its constituent elements. The bulletin's contents do not necessarily reflect official Army positions and do not supersede information in other official Army publications or Army regulations.

AMEDD Center of History and Heritage

Chief, Mr. Nolan Watson

<https://achh.army.mil>